

Bang & Olufsen

**Master
Control
Link
System**

**WIRING INSTALLATION
AND ACCESSORIES**

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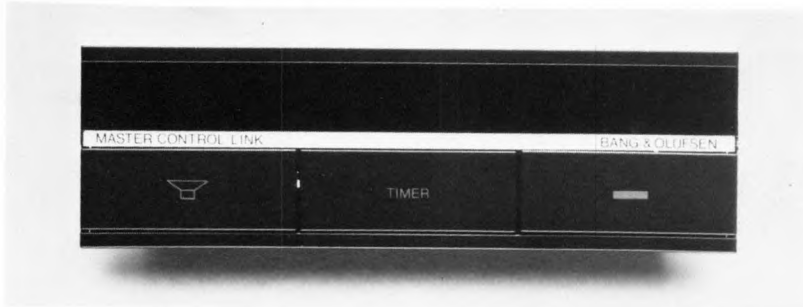
MASTER CONTROL LINK INSTALLATION GUIDE

General

The Master Control Link is a device that allows virtually complete operation and enjoyment of the music system - via remote control - from any room in which it is installed.

The Master Control Link consists of two pieces:

1. The infra-red transceiver



2. The relay box



These devices will be connected together. Add loudspeakers and the necessary control cabling and you have 1 additional remote location. Additional rooms are similarly added by using the same components and parallel connecting the relay boxes.

How does it work?

The Master Control Link System works by passing control signals to and from the Beocenter. It also controls the operation of its own dedicated pair of loudspeakers.

Operation begins when the infra-red transceiver receives a signal from the remote terminal. This signal is processed and passed to the relay box. The relay box now does two things:

1. Activates a relay that switches on the loudspeakers in that room.
2. Passes a "data link" control signal to the Beocenter.

At this point the Beocenter will respond to whatever control signal it has received. This is almost exactly the same thing that takes place in normal remote control operation within the same room as the Beocenter. The difference is that we have just caused the signal to come from another room and are, at the same time, hearing music only in the remote room where control was initiated.

When used with the optional Master Control Panel another sequence of events takes place.



The Beocenter 7700 will send a signal back to the originating MCL. The transceiver will transmit a code back to the Master Control Panel in order to confirm that the desired function has been achieved. This also works, of course, when operating the Master Control Panel in the same room as the Beocenter.

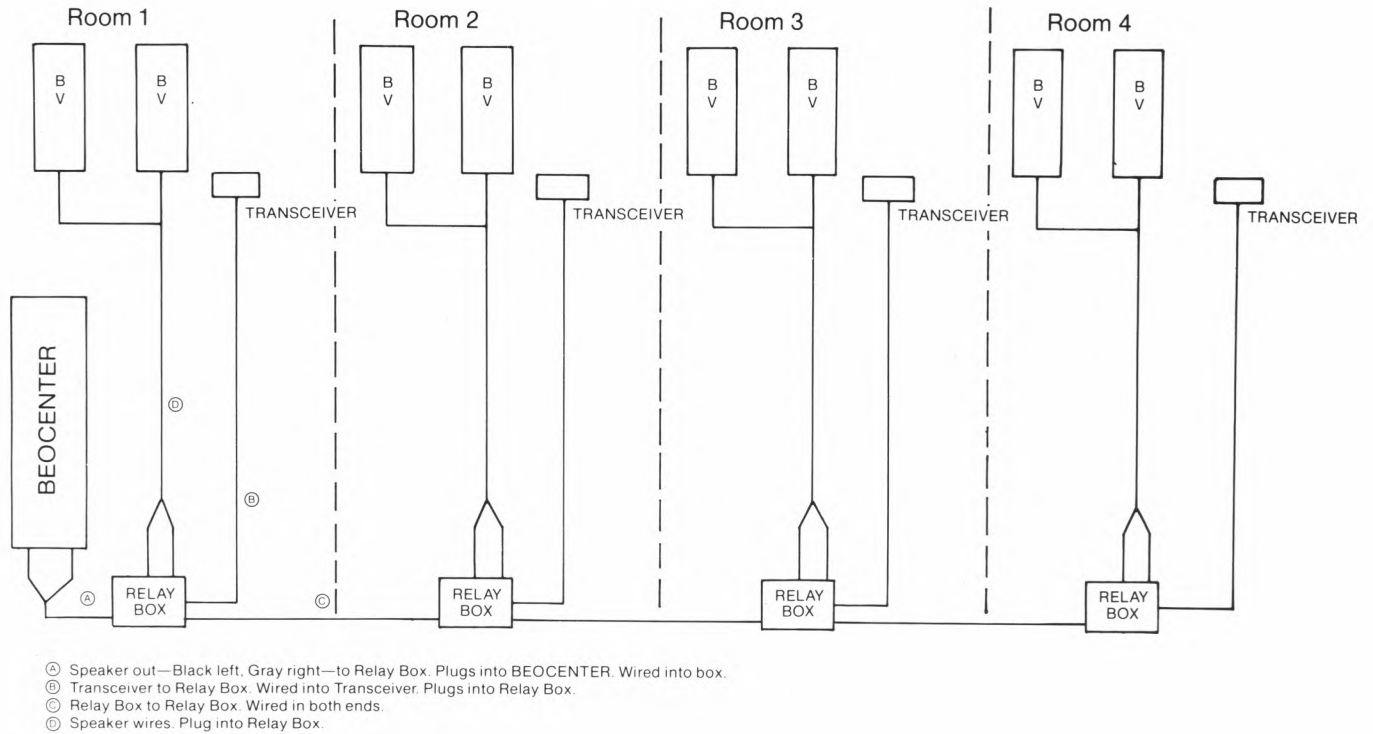
Simply stated, the Beocenter 7700 (when used with the optional Master Control Panel) now has a remote circuit that is a transceiver instead of simply a receiver. The Master Control Link is, basically, an extension of the transceiver in the Beocenter. Complete operational instructions are contained in the owners manuals for the Beocenter, Master Control Panel and Master Control Link. The purpose of the material contained here is to make you aware that the installation works by passing signals to and from the Beocenter.

Understanding Hook Up

Block Diagram #1 illustrates a sample installation.

Diagram 1

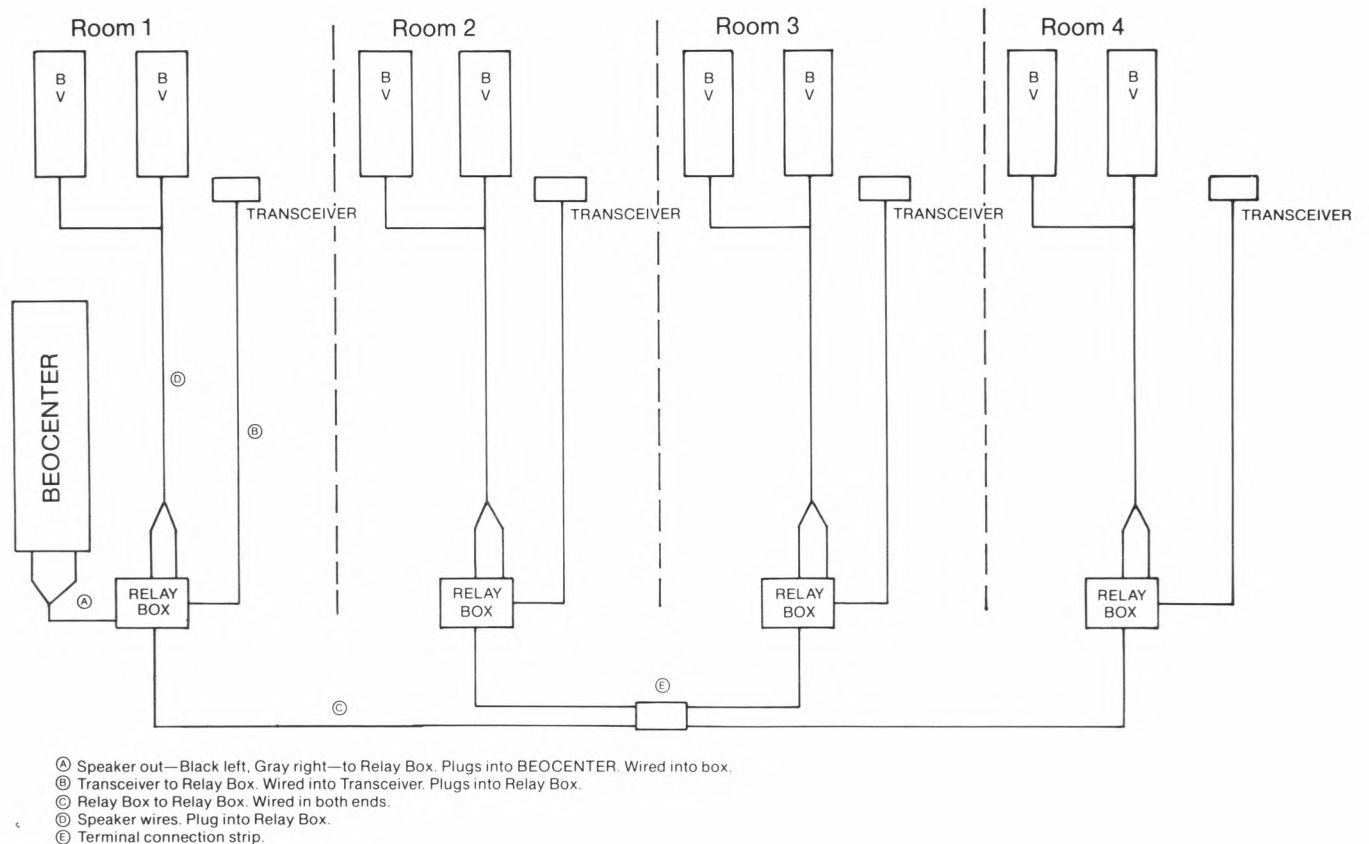
TYPICAL 4 ROOM INSTALLATION



You can see that the first MCL is connected to the Beocenter while subsequent rooms are connected by wiring "relay box" to "relay box". What is being done is that subsequent relay boxes are being paralleled with the first, and, therefore, with the Beocenter.

Diagram 1A shows the same hook up using the optional "external" terminal strip. In this case cables are connected together at a common place rather than connecting "relay box" to "relay box".

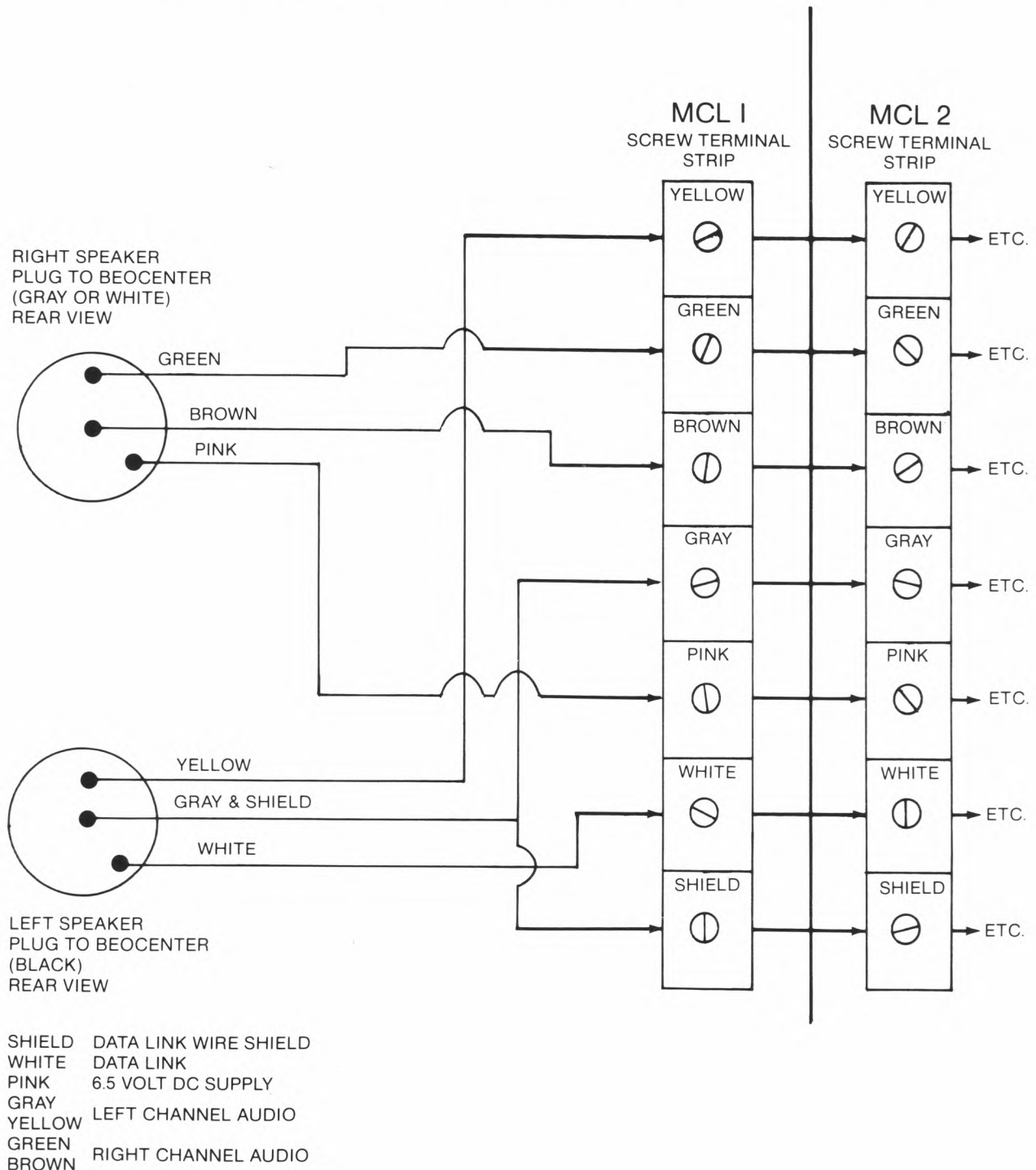
DIAGRAM 1a



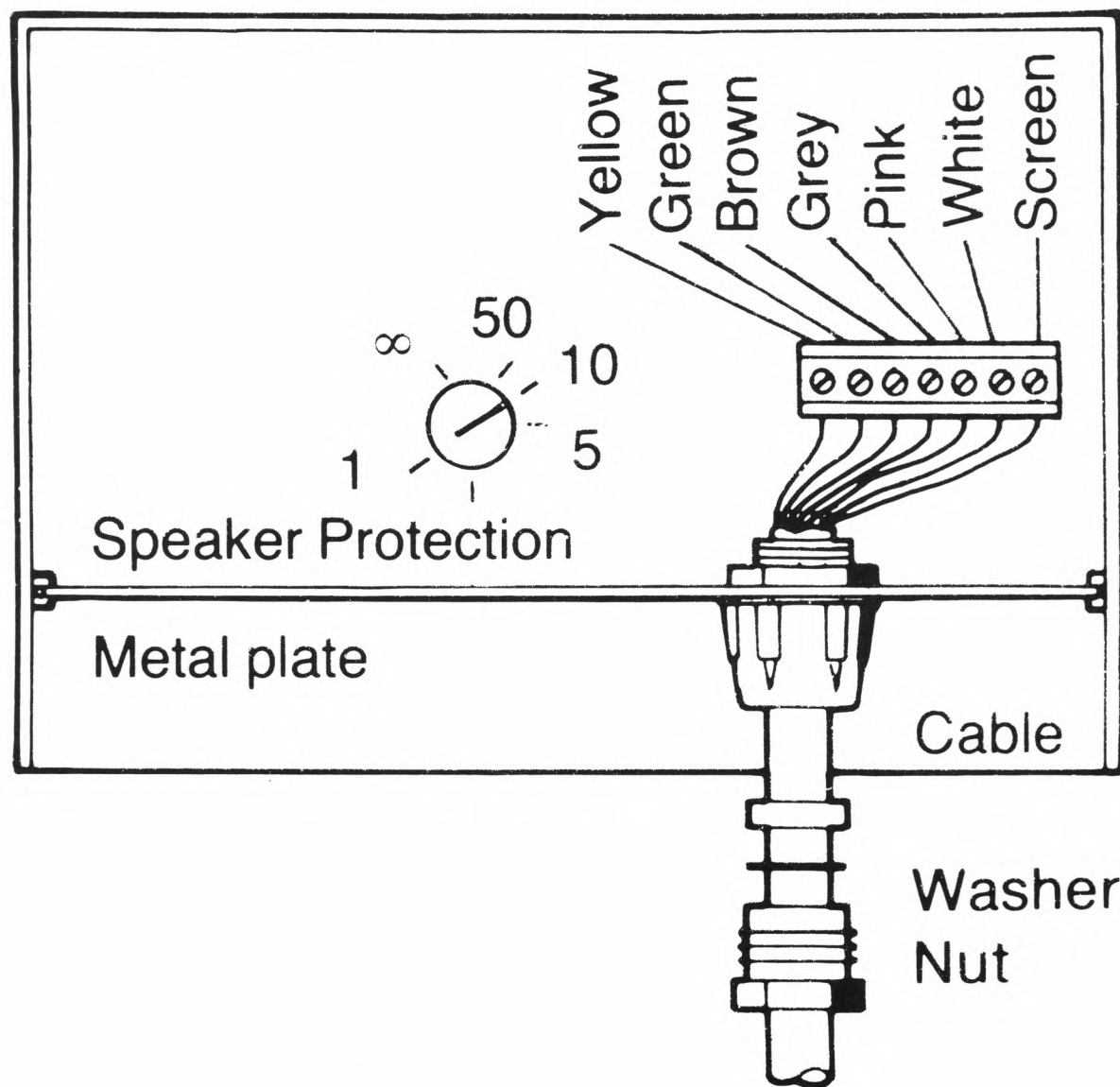
The connection between the Beocenter, MCL 1 and subsequent relay boxes is all accomplished by the use of 7 wires. Diagram 2 shows how these connections are made. You can see that the "MCL 1 to Beocenter" cable terminates in special 3 pin speaker plugs. The offset 3rd pin on the left channel provides the means of passing the data link signal to and from the Beocenter and the MCLs. The offset 3rd pin in the right channel provides operating voltage (6.5V DC) to the MCLs.

Diagram 2

WIRING DIAGRAM FROM SPEAKER PLUGS TO BEOCENTER AND RELAY BOX TO RELAY BOX

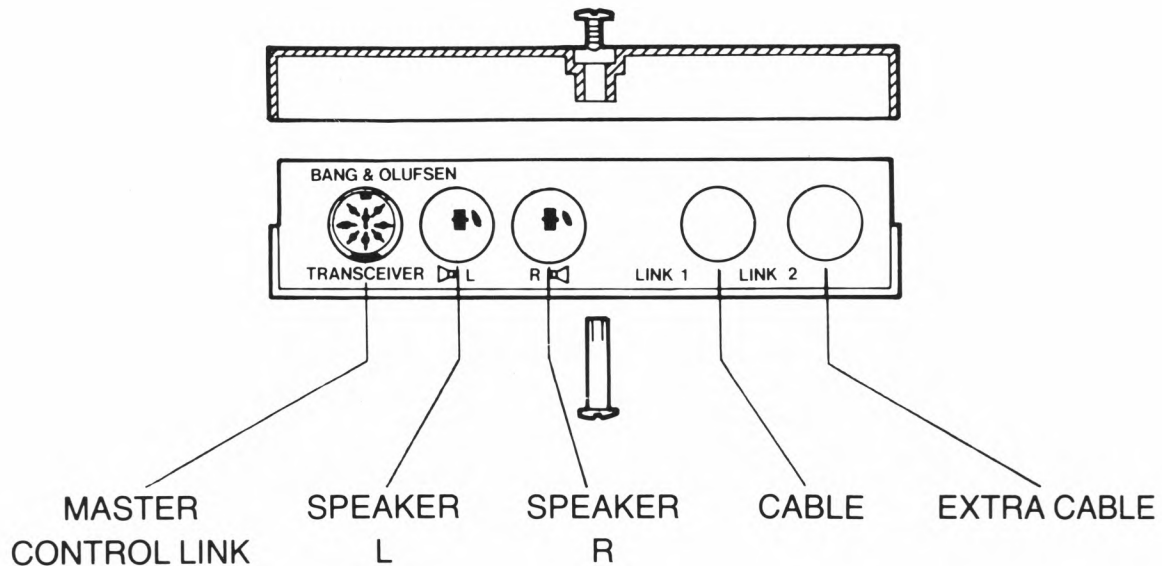


With MCL 1 connected by simply plugging into the Beocenter, you can see (Diagram 2, page 6) how an additional MCL is connected by connecting additional cable between the screw terminal strips. Diagram 3 shows the positioning of the screw terminal strip inside the relay box.



The infra-red transceiver is supplied with cable that plugs into the relay box. Loudspeakers also plug into the relay box. Diagram 4 illustrates the position of these jacks and, also cable entry and exit positions.

DIAGRAM 4



Note that there are 3 small wire coding switches inside the relay box. Diagrams 5, 5a and 5b show how these switches are positioned for different applications. You may position these, as needed, with a pair of tweezers or long nose pliers.

Diagram 5

Beocenter 7700

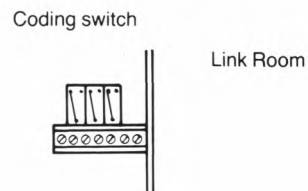


Diagram 5a

Beocenter 7000

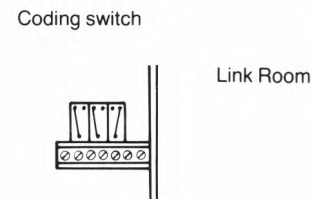
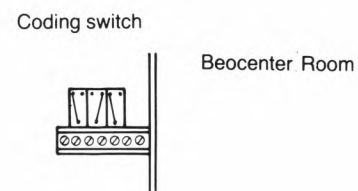


Diagram 5b



Protection of Loudspeakers

You can also connect loudspeakers that are designed to a lower output than your music system.

An adjusting knob in the relay box, see Diagram 3, can be adjusted for the output of the loudspeakers in questions. If you exceed this value an electronic circuit will automatically uncouple the small loudspeakers in the system.

The scale is valid for 8 ohms loudspeaker.

Physical Placement

There are few limitations to the physical positioning of the MCL components.

1. The infra-red transceiver must not be hidden. It must have an unobstructed "field of view" in order to communicate with the remote terminal.
2. The relay box must be close enough to the transceiver to allow connection between the two. The transceiver comes with 3 meters of cable. This may be extended by a maximum of another 3 meters. Maximum distance between the transceiver and relay box is 6 meters.

MCL Limitations

There are not many but they are important.

*Number of units - due to limitations of the 6.5V DC power supply in the Beocenter and speaker impedance matching, there is a practical maximum of 4 MCLs in a system.

*Cable Lengths -

- a. Transceiver to relay box - maximum 6 meters each
- b. Inter-relay box cables - approximately 50 meters total in the system. This is due to potential problems of cable capacity having an effect on the data link signal.

*Interference - the infra-red transceiver should be positioned in such a way that it will not receive strong natural, fluorescent or incandescent light shining into its front panel. This may impair the infra-red transmission or reception.

*When used with the BR 7000 these are some differences in operation:

- a. When activating the MCL in one room, all other rooms that were on will be on again. Rooms that were off will remain off. In the case of the BR 7000 the transceiver speaker switch functions almost like a mechanical on/off switch. If the speakers were on they will be on again. If the speakers were off they will remain off unless the MCL in that room is activated either by using the remote terminal or by pushing the transceiver speaker switch. This is in contrast to use with the BR 7700 where all speakers are automatically off when the system is powered down.
- b. Pressing the "speaker" switch on the transceiver will not turn the BR 7000 on. You must use the remote terminal.
- c. The transceiver "timer" switch is inoperative when used with the BR 7000.

Installation

Every installation is a "custom" job. Depending upon the circumstances there is a wide variety of ways to install the system. The Accessories List attached, will help you in planning your installation. You may mount the relay boxes in the attic or crawl space where they can be readily connected together and run the speaker wires to wall plates in the room. Or you may want to place the transceivers on top of a shelf or table, hide the relay box in an accessible spot elsewhere and run cable from box to box along baseboards, under carpet, etc. You may do combinations of these. Remember to check local building electrical codes when installing.

For your convenience, let's walk through two hypothetical installations. First, an installation where we will use table top stands for the transceivers, hide the relay boxes, and run cable along a baseboard.

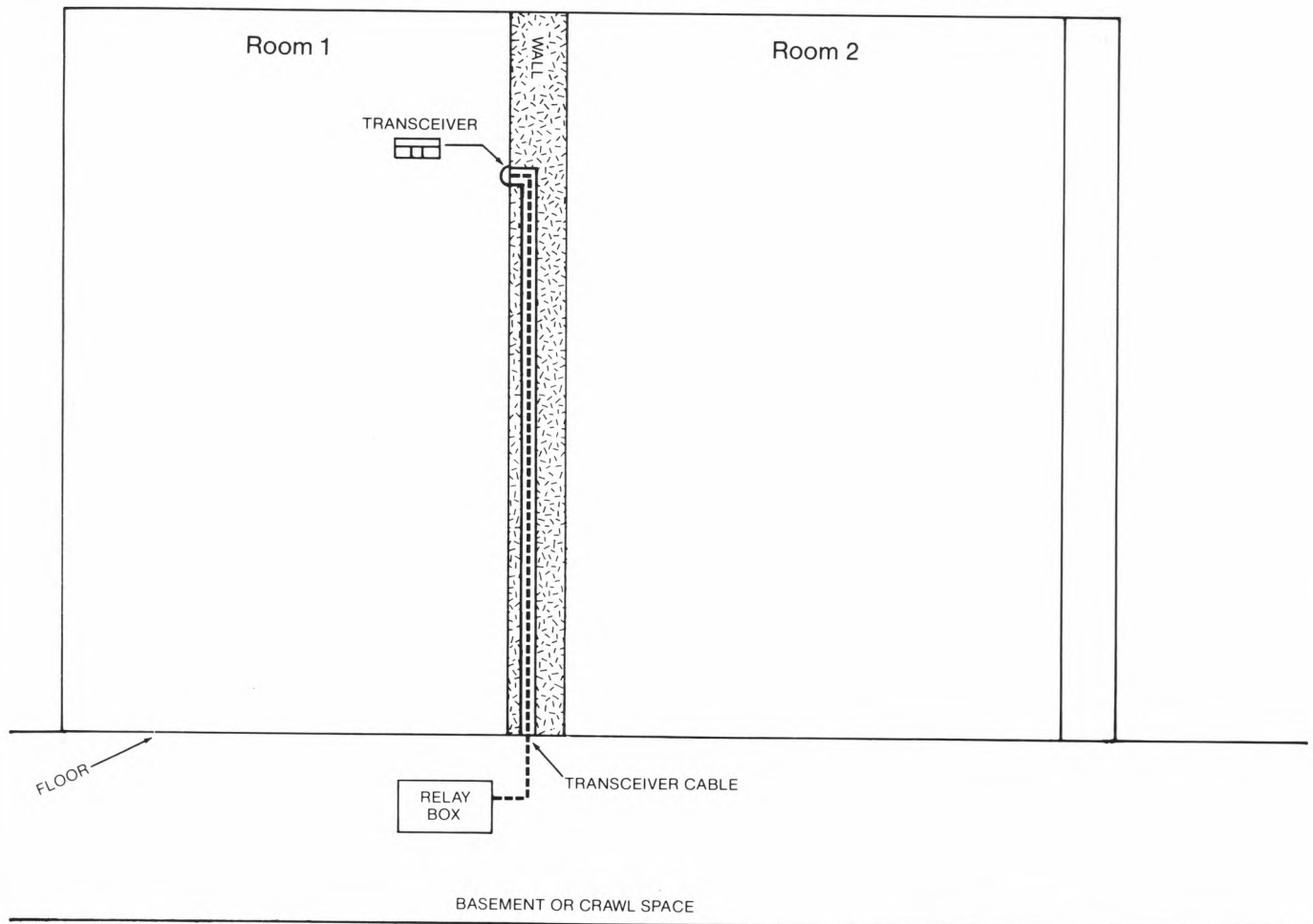
1. Position the Beocenter, relay box, transceiver and loudspeakers in the desired locations. In this case imagine the Beocenter in its cabinet with speakers on either side. The transceiver is placed on top of 1 of the speakers. The relay box will be hidden on the floor behind the stands. This relay box and transceiver will be MCL 1.
2. Position the components in the next room to be added - transceiver, relay box and speakers. Assume we have placed the speakers on a shelf, the transceiver on the shelf and the relay box will go on the floor.
3. Lay out the cable between the two relay boxes and connect the cable to the relay box MCL 1, as described in the "Installation Tips". Also connect a "Beocenter to relay box" cable of adequate length, check the position of the coding switches and speaker protection pot and re-assemble the box.
4. Conceal the interconnecting cable as best possible. In this case, assume that we have simply run the cable along the baseboard to the next room. Our intent is to have the cable run be as invisible as possible and not to have any loose cable that could constitute a hazard.
5. Open the MCL 2 relay box and connect the relay box cable as described in the "installation tips". Check the position of the coding switches and speaker protection pot and re-assemble the box.
6. Plug the MCL 2 transceiver and speakers into the relay box.
7. Plug the MCL 1 transceiver and speakers into their relay box.
8. Plug in the "Beocenter to relay box" cables - Black to the left channel, Gray (or white) to the right channel.
9. Plug in the Beocenter and test system operation. Additional rooms would be similarly added. MCL 3 relay box connecting to MCL 2 relay box, etc..

Now let's do a step by step "custom job". We'll install 1 extra room. Follow the steps carefully and refer to the diagram for each step. The dotted line in the diagram illustrates the step just completed.

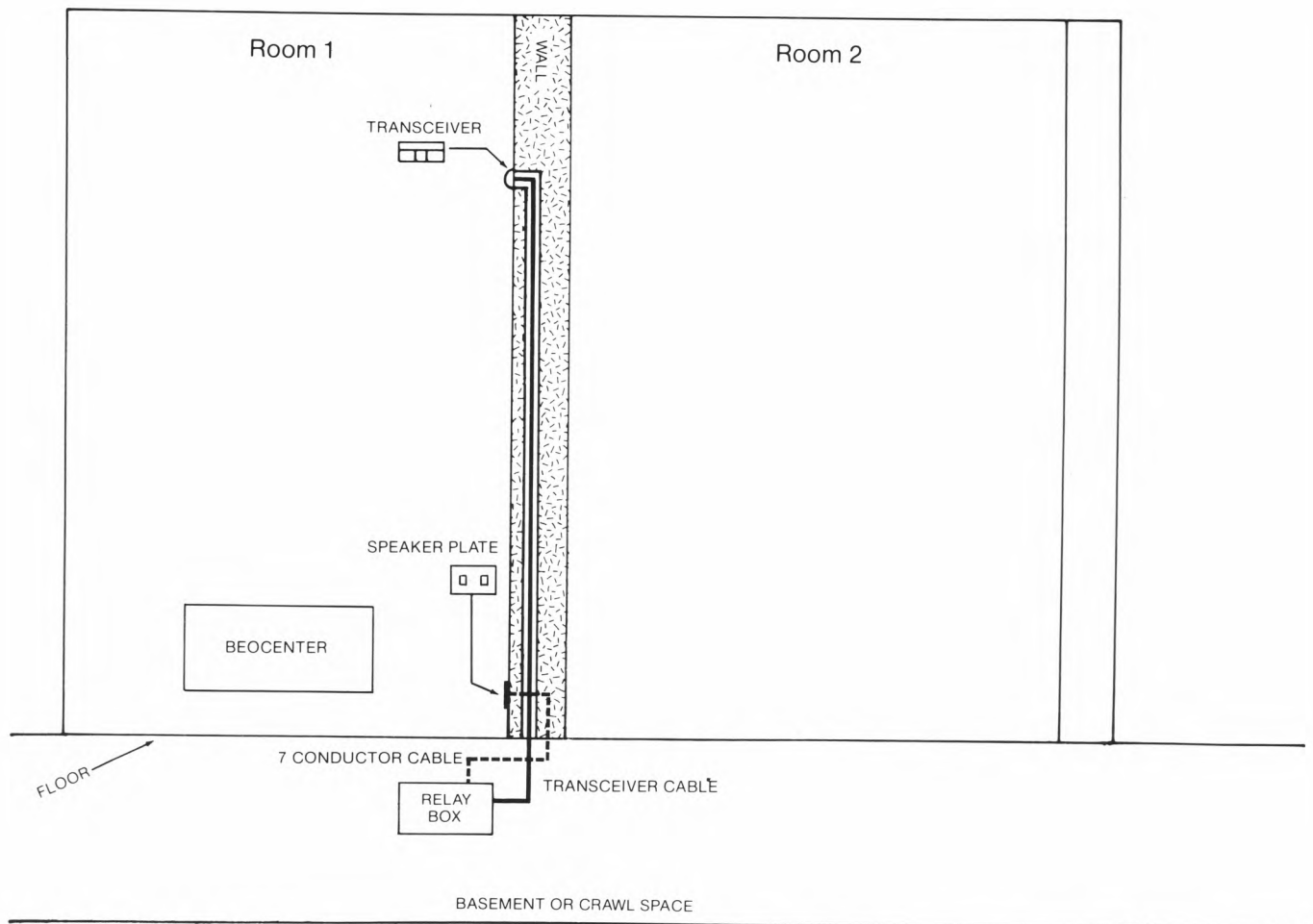
1. Starting in the first room (the one with the Beocenter), determine the positioning of the Beocenter, transceiver, and speakers. We will be installing the transceiver in the wall, running the cable down to the crawl space and positioning the relay box near where the cable comes down. For this room we will need:

<u>QTY</u>	<u>PN</u>	<u>DESCRIPTION</u>
1	Master Control Link	
2	9345002	Speaker plates
1	9345001	Transceiver Flush Mount
1	6270266	Cable from BCT to 1 speaker plate
2	7220288	3 pin speaker plugs (for above)
2	7220027	2 pin speaker plugs (for speaker wire at relay box)
_meters	6250113	7 conductor cable

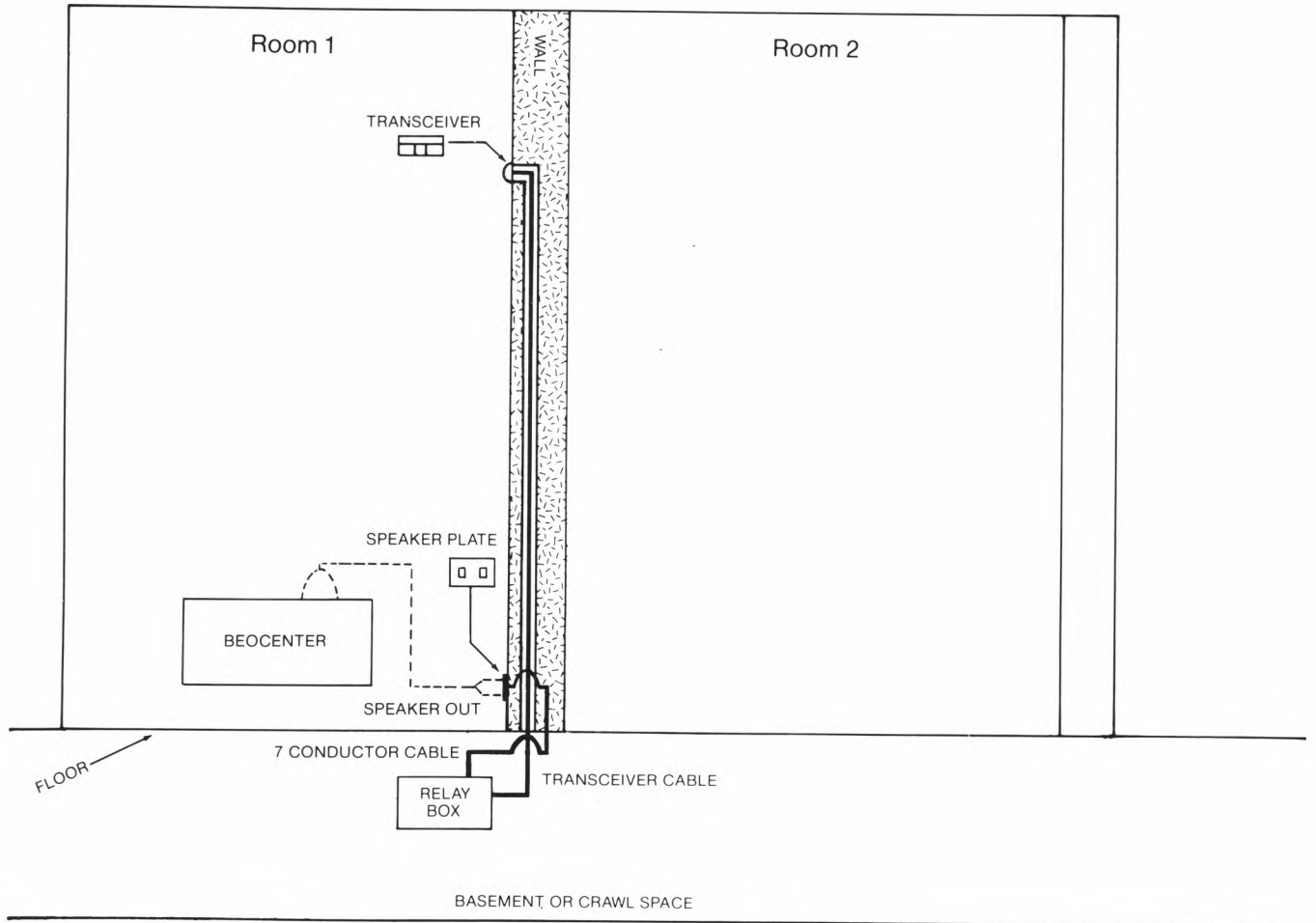
2. First, install the transceiver by following the directions supplied in the "transceiver flush mount kit". When fishing this cable you may find it easier to remove the din plug. It makes it easier to fish through the small openings.



3. Now connect the Beocenter to the relay box. We'll do this in two steps:
- a. Following directions provided, install a speaker plate in the wall in a spot convenient to the Beocenter. Run the 7 conductor cable from the relay box and, following the wiring diagram, solder the cable to the speaker outlet plate jacks.



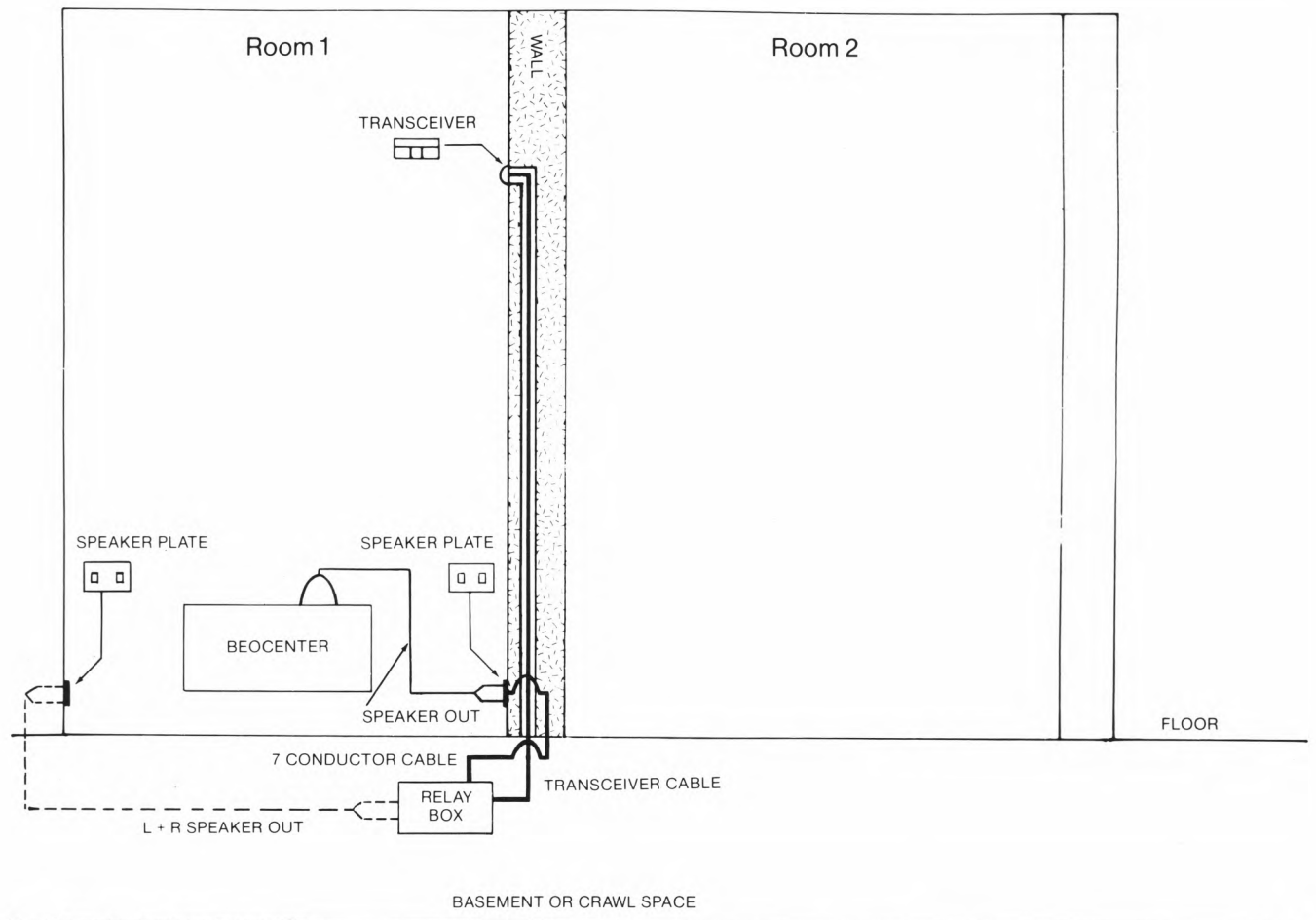
- b. Now we need a cable from the Beocenter to the just installed speaker plate. Using a cable of adequate length (refer to the accessories list) solder 2-3 pin speaker plugs to the open end of the cable. Watch color code and pin position.



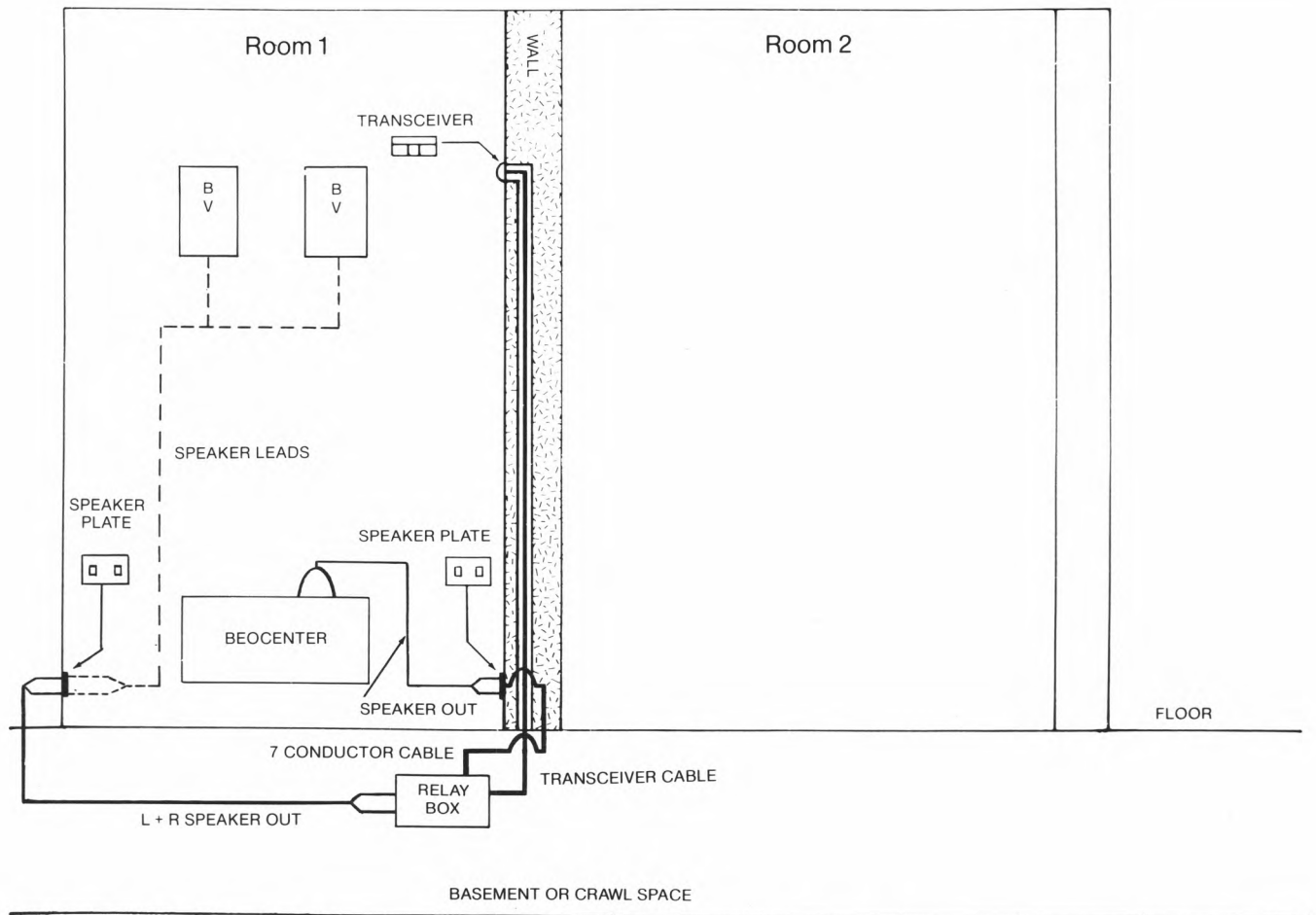
We now have the means of having all necessary inputs to the relay box:

- . Transceiver
- . L & R audio
- . Data link
- . 6.5V DC

4. Now we need the output of the relay box - audio to the speakers. Determine positioning of another speaker plate and install as before. Run speaker wire from the relay box and solder to the jacks in the speaker plate.



Plug in the loudspeakers.



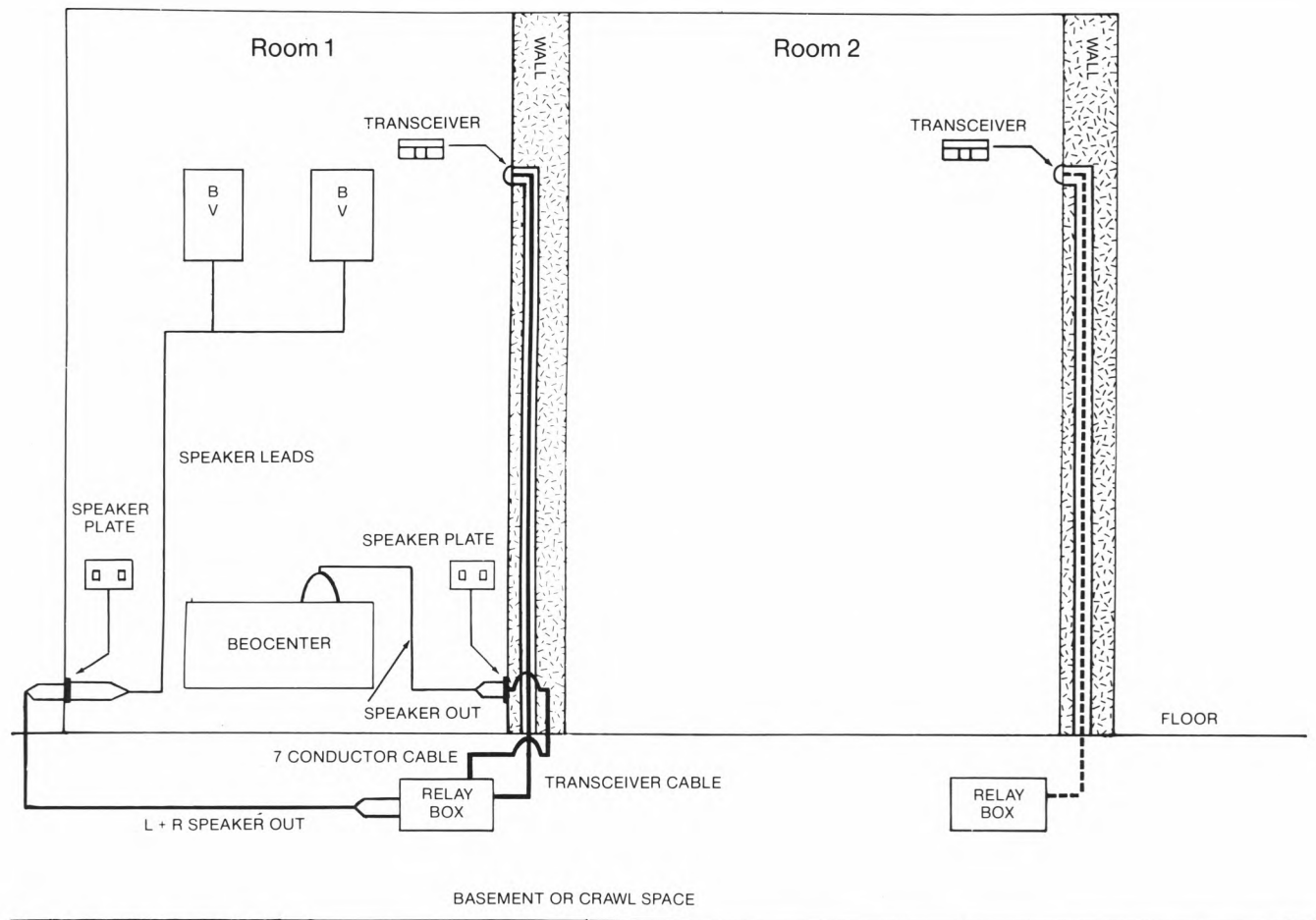
We now have all the necessary inputs and outputs for room 1 in place. Note: Thus far we have only run wires to the relay box. We will connect all relay boxes when all the hardware and cabling is in place.

On to room 2.

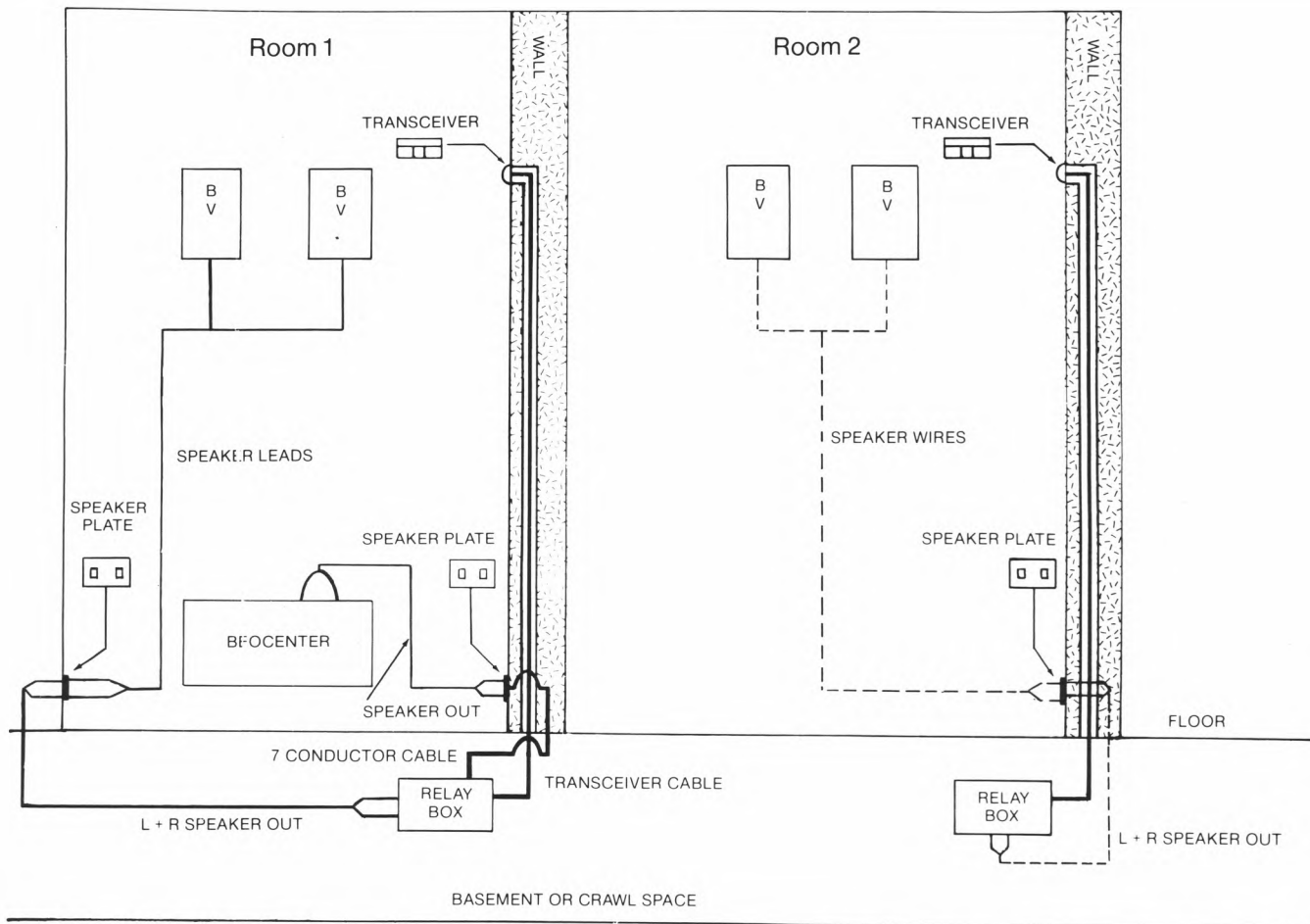
5. For this room we'll need:

<u>QTY</u>	<u>PN</u>	<u>DESCRIPTION</u>
1	Master Control Link	
1	9345001	Transceiver Flush Mount
1	9345002	Speaker plate
2	7220027	2 pin speaker plugs
_meters	6250113	7 conductor cable

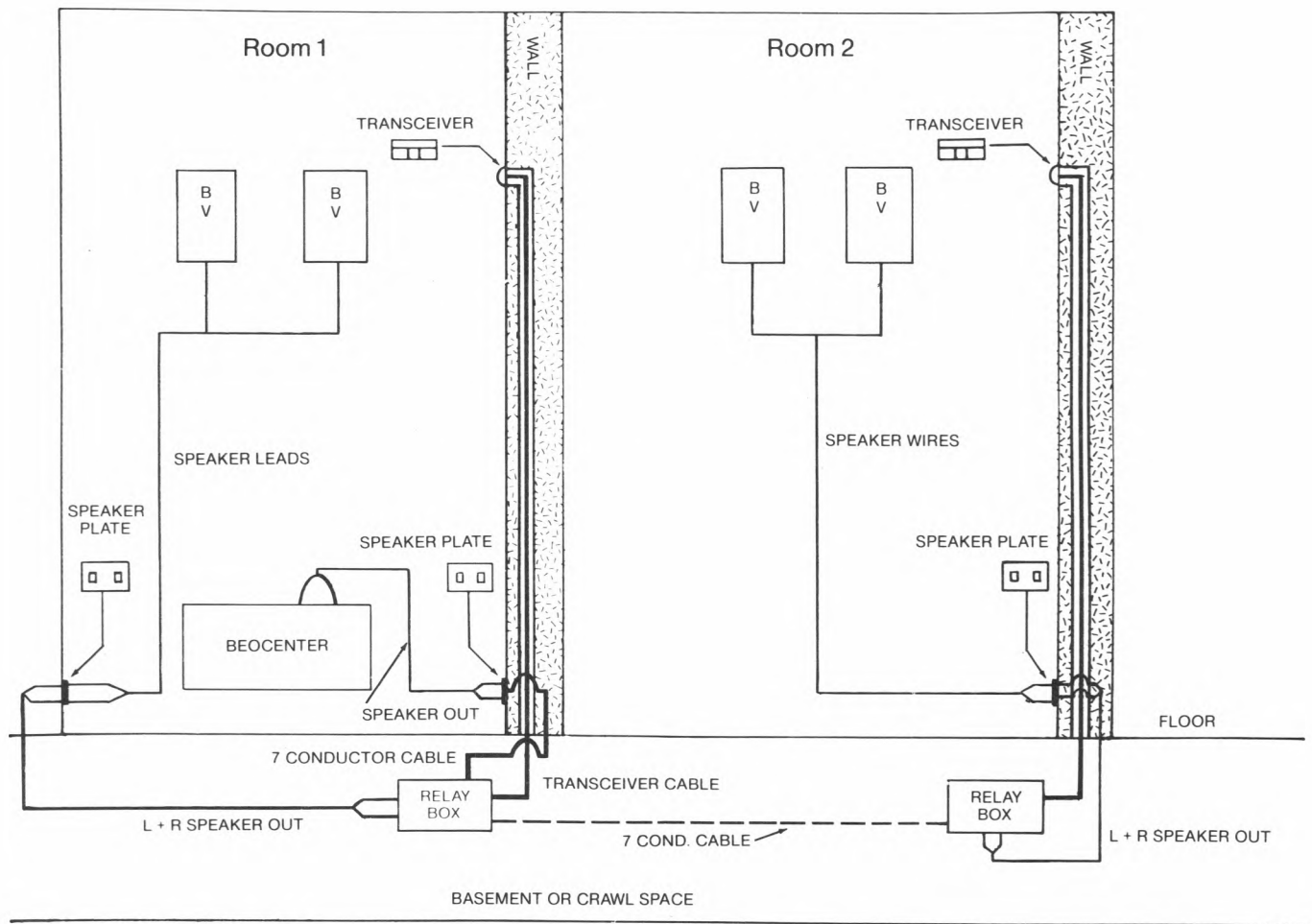
First, position and install the transceiver as in Step 2.



6. Determine speaker positioning and repeat Steps 4 & 5.



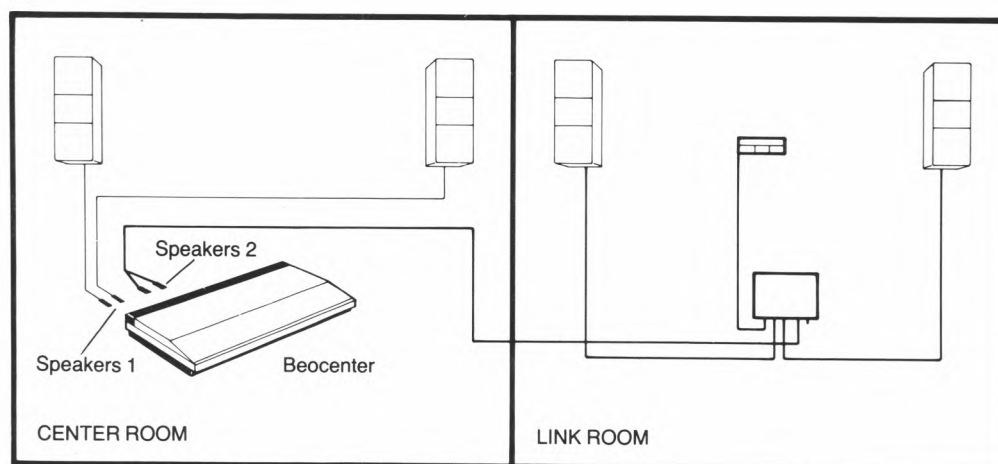
7. Run the 7 conductor cable between the 2 relay boxes. All wires are now in place. What remains is to make the physical connections to the relay boxes.



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- The diagram illustrates a two-room audio system layout. It shows two rooms, Room 1 and Room 2, separated by a wall. In Room 1, there are two B V (Bass/Voice) speakers connected to a BEOCENTER. A 110VAC source is connected to the system. A TRANSCEIVER is connected to the wall. SPEAKER LEADS connect the BEOCENTER to the wall. A SPEAKER PLATE is also shown. In Room 2, there are two B V speakers connected to a TRANSCEIVER. SPEAKER WIRES connect the speakers to the wall. A SPEAKER PLATE is also shown. A 7 CONDUCTOR CABLE runs along the wall, connecting the TRANSCEIVER to a RELAY BOX. The RELAY BOX is connected to the BEOCENTER in Room 1. The diagram also shows the FLOOR and BASEMENT OR CRAWL SPACE.

Why a link on the speakers in the same room as the Beocenter?

We have shown the system this way in order to illustrate a complete MCL hook up. You could connect the speakers in the same room as the Beocenter to speaker 1 output and connect another room - through an MCL - to speaker 2. This would work. There is a potential drawback to operation this way. The speakers in the Beocenter room would come on whenever any MCL was activated if speaker 1 and speaker 2 switches in the Beocenter were both in the on position. Remember that speaker control is provided by the relay in MCL relay box. If we have speakers connected directly to the Beocenter, they will be on whenever the Beocenter is on. This could be overcome by turning on/off the speaker switches on the Beocenter. The diagram below illustrates how the system would be hooked up for this kind of installation.



Installation Tips

*When connecting wires to the screw terminal strips be sure and pre-tin the wires. It makes them easier to install and reduces the chance of shorts between wires.

*Be absolutely certain that the correct color coding is observed - from plugging the first MCL into the Beocenter and out to the last relay box. Refer to Diagram 2. Remember that the illustration shows connecting cable terminations for the speaker plugs and relay boxes.

*Keep in mind that you may need to troubleshoot the system. Your relay boxes should be reasonable accessible for this purpose.

*When making cuts in drywall be sure and follow the template supplied and make your cuts carefully. There is, due to the design of the cover plates, small room for errors.

*Do not exceed the 4 link limitations. One of several things will most likely occur:

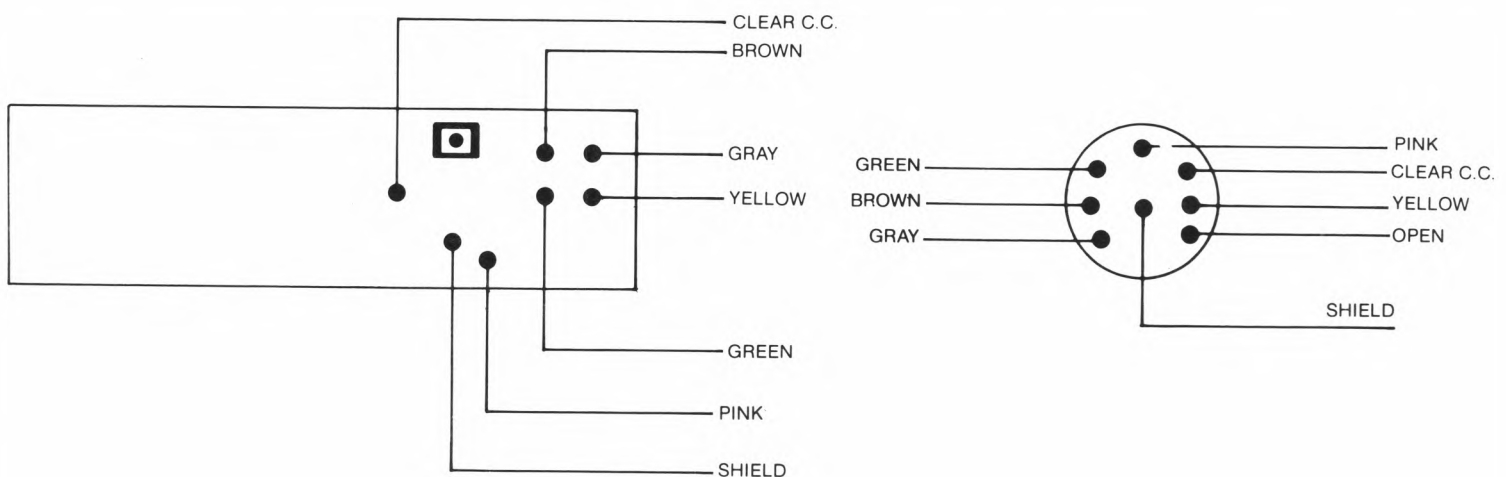
- a. The system will be inoperative
- b. The system will work for a while before causing the 6.5V DC supply to fail
- c. You will have poor or distorted audio

*Follow the placement of the coding switches carefully. Failure to do so will cause unpredictable results ranging from complete inoperation to improper operation. One of the most common oversights is failure to observe the difference in position of the switches for the MCL connected to the speakers in the same room as the Beocenter and those for other remote rooms. This has caused good remote operation but does not allow speakers to come on when using the key pad on the Beocenter.

*It is difficult to "fish" the transceiver cable with the connector attached. This is most easily done by removing the connector, fishing the cable and reattaching a new connector.

Diagram 6 illustrates the wiring of the transceiver cable and plug.

DIAGRAM 6



*Use the following procedure for connecting relay box cables:

- a. Remove the screw in the center of the relay box and remove the relay box cover.
- b. Remove about 2" of the cable outer jacket. Free the shield from around the white wire and twist it together to form the "seventh" wire. Cut off the unused "rubber wire" in the cable. Strip approximately 1/4 inch from each of the colored wires. Carefully twist the strands of each wire tightly together and tin the wires.
- c. Pass the cable through a strain relief and through whichever hole is required in the relay box front plate.
- d. Insert the wires into the terminal strip - 1 at a time - by loosening the screw, inserting the wire and retightening the screw. Wire insertion is best done using long nose pliers.
- e. Insure that all wires connected to the terminal strip are secured and that there are no loose strands that may short together.
- f. Tighten the strain reliefs and check the position of the coding switches.
- g. Reassemble the relay box.

*Use caution when fastening down connecting cables. Rather than staples, we suggest the use of cable fasteners such as those used by the telephone company. This reduces the possibility of a short circuit in the cables.

*We recommend only the use of the B&O supplied cables. Data link shielding and cable capacity are critical to proper operation.

Custom Hook Up

Some installers have expressed a desire to expand the system beyond normal 4 MCL capability. The use of extra DC supply and power has been proposed.

Diagram 7 & 8 show how this may be done but there are some important things to remember:

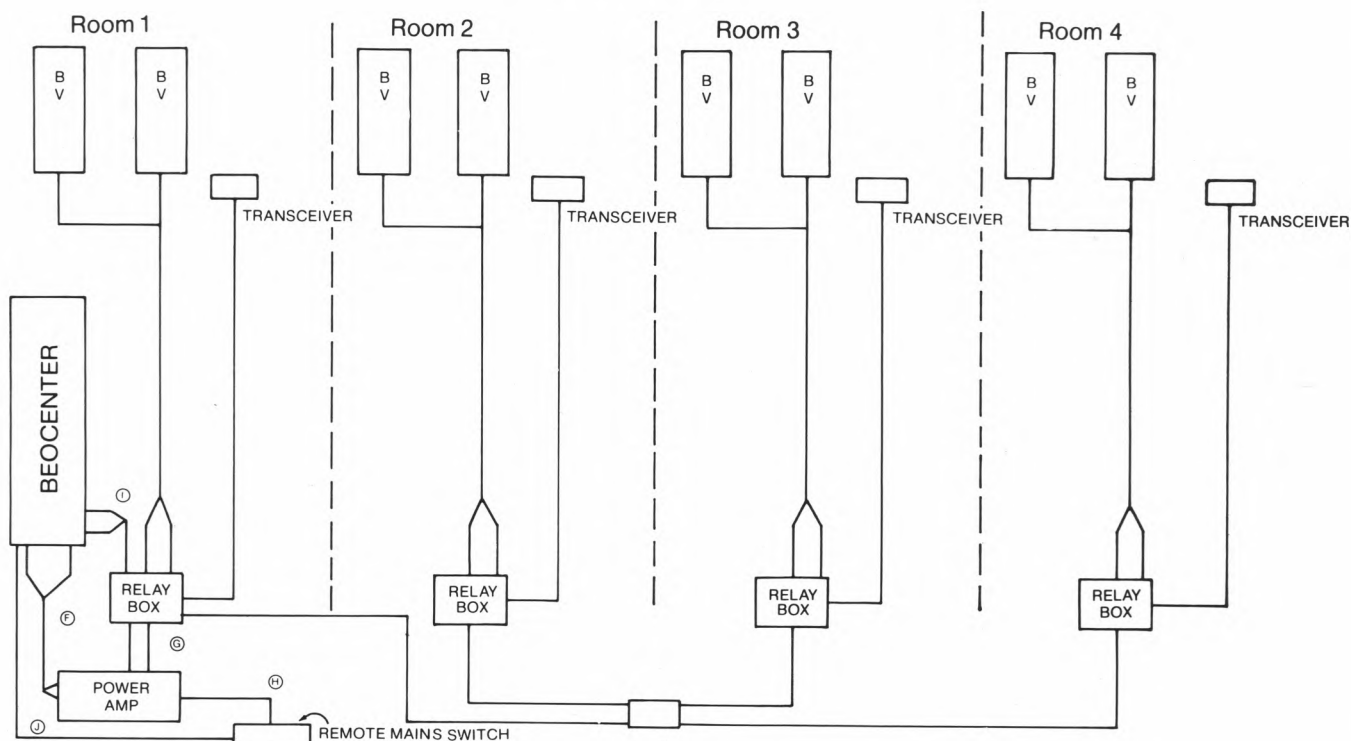
*The 6.5V DC required by the MCLs is critical. The MCL uses a micro computer so it is necessary to have an extremely "fast" power supply. An inadequate supply can cause inoperation of the system.

*The Beocenter 7700 has a pre amp out so a power amplifier may be used and run through the MCL instead of the regular speaker outputs of the Beocenter. You may in this instance want to substitute the power amp outputs for the normal speaker outputs at Link 1.

*We have seen cases where improper speaker phasing has caused erratic operation of the system. Be sure to observe correct speaker phasing.

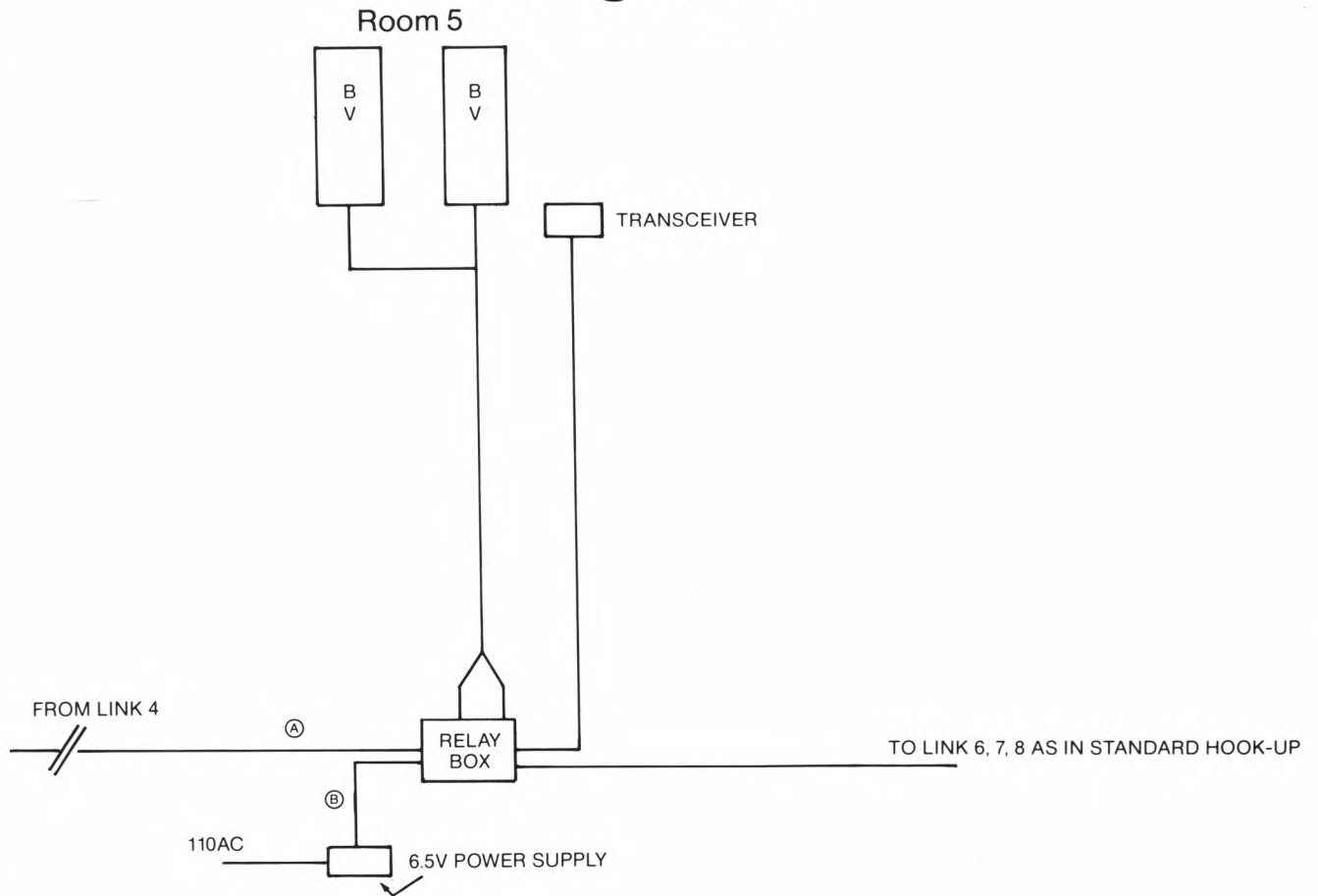
*The speaker switching relay in the MCL relay box has a 75 watt switching capability.

Diagram 7



- ① Pre-amp out to power amp in.
- ② Power amp out to terminals in relay box—formerly where audio out of BEOCENTER connected.
- ③ Power amp AC.
- ④ Data link and 6.5vDC. From 3rd pin on speaker jacks to normal connection in Relay Box.
- ⑤ BEOCENTER to remote main switch—turns on power amp—OPTIONAL.

Diagram 8



Ⓐ Standard connection of 7 conductor "Box to Box" cable. Disconnect Pink wire at Relay Box.

Ⓑ 6.5VDC to terminal strip in place of Pink wire coming from Link 4. Connect ⊖ to shield. Connect ⊕ to the terminal strip in place of the Pink wire.

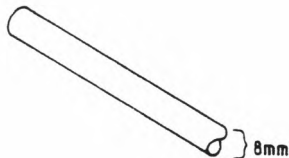
Accessories to be used for the set up of Master Control Link



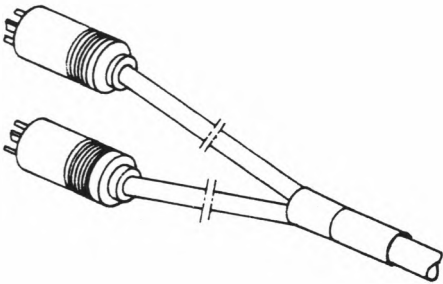
7220288 3 pin speaker plug. Used as termination on cable from MCL 1 to Beocenter.



7220027 2 pin speaker plug. Used to connect speaker wire to relay box.



6250113 7 conductor cable. Used from relay box to relay box and from MCL 1 to Beocenter. Delivered in 100 meter rolls.



6270266 Premade cable for link 1 to Beocenter. 1.5 meters long.

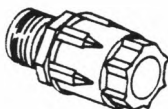
6270267 5 meters long

6270268 10 meters long

6270269 15 meters long

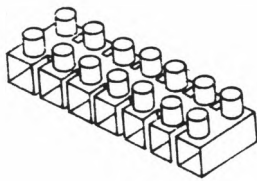
6270270 20 meters long

6270271 30 meters long

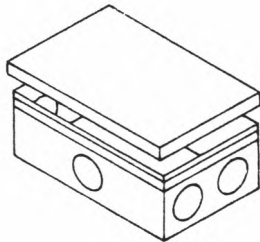


3034060 Cable fastener. Used to secure cable entering/exiting relay box.

(continued)



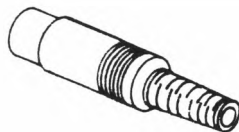
7505017 7 pin terminal strip with spring contacts. Used to interconnect relay boxes. Instead of wiring box to box, each box is wired to the terminal strip.



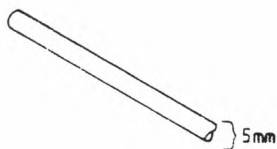
3152391 Box to enclose terminal strip #7505017



3034061 Cable relief. Used for entry cables to box #3152391

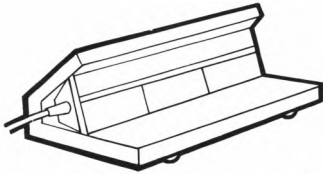


7220345 8 pin din plug. Used as termination of cable from transceiver to relay box.

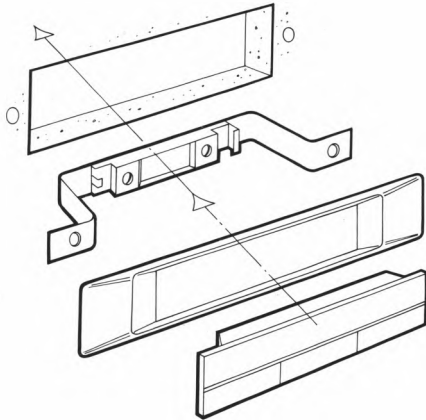


6250114 Cable from transceiver to relay box.

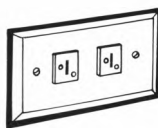
(continued)



9345000 Table top mount for transceiver. Used as a means of placing the transceiver atop a flat surface such as a table or shelf



9345001 Flush mount wall bracket. Used to install the infra-red transceiver in a wall.



9345002 Speaker wall plate. Used for loudspeaker connections. Can also be used as Beocenter to Link 1 plate.